

State of California
The Resources Agency
Department of Fish and Game

**RECOVERY STRATEGY FOR
CALIFORNIA COHO SALMON**
Report to the California Fish and
Game Commission

Prepared by
The California Department of Fish and Game

Species Recovery Plan Report 2003-1

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4 Recovery Goals and Delisting Criteria

The primary and statutorily required goal of the recovery strategy is to recover coho salmon to the point where the regulations, or other protections for coho salmon, listed under CESA are not necessary (FGC §2105). The recovery strategy incorporates an additional goal of restoring tribal, recreational, and commercial coho salmon fisheries in California (see Section VI below). The processes to achieve this additional goal are under the authority of the Commission and the Pacific Fisheries Management Council (PFMC), an organization comprised of the Pacific coastal states, including California, the federal government, affected Indian tribal governments, the ocean sport and commercial fishing industries, and ocean conservation organizations.

The frameworks for: a) recovery required by CESA, i.e., delisting; and b) restoring coho salmon fisheries are briefly discussed and outlined below. Research, monitoring, and adaptive management will be used to both improve the framework and measure achievement of these goals.

4.1 FRAMEWORK FOR DELISTING CRITERIA

The recovery strategy must meet specific conditions that are evaluated by the Commission (§2111(a)-(d).). These conditions are:

- a. The strategy will conserve, protect, restore, and enhance coho salmon (as a species);
- b. Both the strategy and the implementation schedule are capable of being carried out in a scientifically, technologically, and economically reasonable manner;
- c. The strategy is supported by the best available scientific data; and
- d. The strategy represents an equitable apportionment of both public and private and regulatory and nonregulatory obligations.

The approach to achieving the primary goal is to improve coho salmon populations and habitat so the species is neither threatened nor endangered with extinction throughout all, or in a significant portion of, its range. Hence, the regulations or other protections for coho listed under CESA would no longer be necessary. Achieving this will take a combination of five principle delisting requirements, addressing coho

salmon populations and habitat. These requirements, and criteria for each, are outlined below in a delisting framework.

Each criterion, and the processes for evaluating the status of the criterion, are listed below. The criteria are both scientifically objective and measurable. For many of these criteria, the timeline for development quantitative aspect is the same as that of the NOAA Fisheries' two TRTs work on the two coho salmon ESUs in California. The Department is participating in both TRTs, and when they release their public documents, the Department will add the quantitative elements to an update of its recovery strategy and will allow the framework to be adopted as formal delisting criteria. Integrating Department and NOAA Fisheries timelines for criteria development will not delay the determination of delisting because a determination that delisting or downlisting is warranted will require a sustained trend over multiple coho generations.

The five delisting requirements are linked together by the overall ecological goals they attain through their integration. Those goals are to maximize genetic diversity and persistence through environmental variation and random events and across the range of coho salmon in California. The delisting requirements apply to natural stocks of coho salmon and coho salmon produced from conservation and mitigation hatcheries; their fulfillment at the ESU or range-wide level will signal the ability to downlist or delist coho salmon under CESA.

The scientific terminology included in the delisting requirements come from the fields of ecology and conservation biology and are defined in Appendix B: Glossary.

*Downlisting/ delisting will occur when all requirements are fulfilled.
Each requirement is fulfilled when all of its recovery criteria are met.
Criteria are evaluated by the processes outlined under each criterion.
Delisting will occur when incidental take from recreational fishing and
by-catch from commercial fishing can be sustained without causing a
high probability of extinction.*

Important points to remember:

- a. Because the CCC ESU will be listed as endangered, it will have two sets of criteria. The first set will be developed to determine when the CCC ESU can be down-listed from endangered to threatened. The second set will be for delisting.¹

¹ The Southern Oregon~Northern California Coastal ESU will be listed as threatened so will have one set of criteria for delisting.

- b. The Department, in conjunction with NOAA Fisheries, currently is in the process of evaluating specific, quantitative elements regarding recovery criteria. The Department intends to quantify coho salmon population and habitat metrics when the initial TRT processes are complete
- c. Information the Department is gathering through presence-absence coho salmon surveys, initiated in 2000 and continuing, will be used to establish both the index sampling sites and the pool of random sampling sites referenced in several criteria.
- d. A method to determine the risk of extinction of coho salmon populations will be developed in cooperation with the TRTs.

4.2 DELISTING REQUIREMENTS

I. Maintain and protect the number and size of key populations of coho salmon.

Criterion 1 Key populations are maintained at levels that reduce the risk of their extinction to insignificant levels.

Process:

- 1. Identify key populations within each ESU.
- 2. Determine population levels that reduce the risk of local extinction to insignificant levels.
- 3. Develop and implement population monitoring, both inland and ocean.
- 4. Identify and apply appropriate protection mechanisms for key populations.

II. Maintain and increase the number of spawning adults and maximize freshwater and estuary survival of juveniles in basins to a level that reduces the probability of extinction to an insignificant level.

Criterion 1 Maintain current level of spawning and outmigration.

Process:

- a. Identify and apply actions and mechanisms for maintaining spawning and emigrating coho salmon.
- b. Conduct inland spawning surveys.
- c. Conduct ocean and nearshore surveys.²
- c. Conduct juvenile emigration surveys.

² Being discussed as an alternate or complement for inland surveys for adult coho salmon.

Criterion 2 Attain a sustained, increased (specified) level in number of adults returning to spawn at documented, recent spawning sites within basins.

Process:

- a. Determine what constitutes ‘sustained’ and the specific increases required.
- b. Identify and apply actions and mechanisms for attaining increased sustained levels of spawning and emigrating coho salmon.
- c. Conduct inland spawning surveys.
- d. Conduct ocean and nearshore surveys.
- e. Conduct juvenile emigration surveys.

Criterion 3 Attain a sustained, increased (specified) level in new spawning sites within basins.

Process:

- a. Determine what constitutes ‘sustained’ and the specific increases required.
- b. Identify and apply actions and mechanisms for attaining sustained new spawning sites.
- c. Conduct inland spawning surveys.

Criterion 4 Attain a sustained, increased (specified) level of juvenile survival within basins and estuaries.³

Process:

- a. Determine what constitutes ‘sustained’ and the specific increases required.
- b. Identify and apply actions and mechanisms for attaining sustained survival of juvenile coho salmon.
- c. Conduct juvenile emigration surveys.
- d. Conduct juvenile estuarine surveys.

III. Maintain and increase the range and distribution⁴ of coho salmon to a level that reduces the probability of extinction of an ESU to an insignificant level.

Range: The Department is investigating the likely potential to increase the range of the SONCC ESU in the upper Eel River basin, below Scott Dam/Lake Pillsbury, and

³ Survival, and not merely production, of young fish is the issue of importance.

⁴ Range is primarily a geographic consideration; distribution is primarily an issue of ecology. Currently, both factors are issues for both ESUs.

in the watersheds that flow directly into San Francisco Bay in the CCC ESU. These criteria assume that the areas mentioned are realistic for re-expansion of current range of coho salmon.

Criterion 1 Maintain the current range and distribution of coho salmon.

Process:

- a. Identify and apply actions and mechanisms to maintain current range and distribution.
- b. Conduct population monitoring (presence/not present, adult, juvenile emigration).

Criterion 2 Increase the range of coho salmon to represent the full range (north, south, inland) once occupied.

To make the decision on what is realistic, three parameters will be evaluated:

- What we know about the present range in each ESU;
- What we know about the historic range in each ESU; and
- What current conditions exist that might limit or prevent range expansion.

Process:

- a. Determine what is realistic for range expansion for each ESU.
- b. Implement actions to expand coho salmon where identified as being feasible.
- c. Conduct annual presence-absence surveys.

Criterion 3 Coho salmon are consistently present in across the CCC from Santa Cruz County to Punta Gorda in Mendocino County to restore coastal connectivity.

Process:

- a. Identify and apply actions and mechanisms for expanding range of CCC Coho ESU.
- b. Conduct annual presence-absence surveys.

Distribution: Increasing the distribution focuses on the condition of coho salmon streams.

Criterion 1 Attain a sustained (specified) percent increase of suitable streams within basins where there is presence of coho salmon.⁵

Process:

- a. Determine what constitutes “sustained” and the target percent increases.
- b. Identify and apply actions and mechanisms for attaining sustained increase.
- c. Conduct annual presence~absence surveys.

Criterion 2 Attain a sustained (specified) percent increase in the number of suitable streams within watershed basins where there is a presence of improved brood-year representation, from one year out of three present to two out of three present.⁶

Process:

- a. Determine what constitutes “sustained” and the target percent increase.
- b. Identify and apply actions and mechanisms for attaining sustained increase.
- c. Conduct brood year analysis.

Criterion 3 Attain a sustained (specified) percent increase in the number of suitable streams within basins where there is a presence of the full brood-year compliment.

Process:

- a. Determine what constitutes ‘sustained’ and the target percent increase.
- b. Identify and apply actions and mechanisms for attaining sustained increase.
- c. Conduct brood year analysis.

IV. Maintain and protect habitat essential for coho salmon.

Criterion 1 Essential habitat, including biological refugia, for coho salmon, is identified, mapped, and protected in each basin.

Process:

- a. Analyze existing watershed assessments and plans.
- b. Gather necessary field data.
- c. Conduct necessary mapping.

⁵ Both permanent index sites and rotating random sites will be utilized in the field sample methodology.

⁶ There likely will also be a 0 of 3 to 1 of 3 metric for the CCC ESU.

- d. Develop and apply a habitat quality index (HQI) based on a standard suite of measurable habitat quality parameters.
- e. Identify and apply actions and mechanisms for protecting essential habitat.

Criterion 2 Appropriate mechanisms to protect essential habitat are applied in each basin.

Process:

- a. Identify and apply appropriate protection mechanisms for essential coho habitat. These mechanisms are being identified as statewide and watershed-specific regarding their scope and interim and long-term regarding their initiation and duration.

V. Maintain, improve, and restore coho salmon habitat to a level that reduces the probability of extinction to an insignificant level.

Criterion 1 Maintain areas where coho salmon habitat have already been restored or enhanced.

Process:

- a. Identify and apply appropriate maintenance procedures for restored or enhanced coho salmon habitat.
- b. Develop and apply a HQI based on a standard suite of measurable habitat quality parameters.
- c. Monitor coho salmon use of restored and enhanced habitat and effectiveness of restoration activities.

Criterion 2 Restore, enhance, and maintain habitat already identified for restoration to benefit coho salmon.

Process:

- a. Analyze existing watershed assessments and plans.
- b. Identify and apply actions and mechanisms to restore and enhance habitat.
- c. Use Department Salmonid Restoration Grants Program.
- d. Use other restoration programs that will benefit coho salmon.
- e. Develop and apply a HQI based on a standard suite of measurable habitat quality parameters.
- f. Monitor coho salmon use of restored and enhanced habitat and effectiveness of restoration activities.

Criterion 3 A (specified) amount of coho habitat is restored, enhanced, and maintained in a (specified) condition within basins⁷.

Process:

- a. Evaluate and prioritize non-assessed coho salmon habitat, including biological refugia, for restoration and enhancement potential.
- b. Identify and apply actions and mechanisms to restore, enhance, and maintain habitat.
- c. Use Department Salmonid Restoration Grants Program.
- d. Use other restoration programs that will benefit coho salmon.
- e. Use watershed councils and organizations with a component focusing on coho salmon restoration and recovery.
- f. Determine amount, quality, and distribution of habitat necessary to reduce the probability of extinction for coho salmon to a level to be considered insignificant.
- g. Develop and apply a HQI based on a standard suite of measurable habitat quality parameters.
- h. Conduct watershed assessment, monitoring, and analysis of coho salmon use of habitat and effectiveness of coho salmon recovery actions.

4.3 FRAMEWORK FOR RESTORATION OF FISHERIES

An additional goal of the recovery strategy is to restore coho salmon numbers to the point where tribal, recreational, and commercial fishing may occur. It is the intent of the Department to collaborate with the appropriate tribes, the federal government, and stakeholders, once delisting is achieved and regulations or other protections under CESA are not necessary, to determine how to accomplish this goal. (See section below.)

VI. Reach and maintain coho salmon population levels to allow for the resumption of tribal, recreational, and commercial fisheries for coho salmon in California.

Coho salmon population levels allowing for fishing will be at a level that exceeds the numbers necessary for recovery. Hence, restoration of the fisheries would occur some time after delisting is realized. Restoration of the fisheries would be implemented and monitored through fishing regulations governed by the Commission and the Pacific Fisheries Management Council and not by the Department through CESA. After delisting is achieved, the Department and the CRT, including appropriate tribes, the federal government, and stakeholders, would determine how to continue

⁷ Permanent protection is not yet addressed and is an important element to be developed.

implementation of appropriate elements of the recovery strategy pursuant to and consistent with other applicable local, state, and federal law and voluntary measures.

4.3.1 RECREATIONAL FISHING

Criterion 1 Commence selected recreational fishing for (specified) years once adult populations have been sustained at or exceeded (specified) level, as described in Delisting Requirements I and II.⁸

Selected recreational fishing would be allowed at sites selected based on the relative health of coho salmon runs and the presence of recreational fishing opportunities and interest.

Process:

- a. Select areas, timing, and duration of coho salmon recreational fisheries.
- b. Open selected coho salmon recreational fishery.
- c. Conduct coho salmon population monitoring.
- d. Conduct inland spawning surveys.
- e. Conduct creel surveys.⁹ This would include a summary evaluation of what is known about incidental take of coho salmon from other recreational fishing.

Criterion 2 Expand recreational fishery to the fullest extent feasible for (specified) years once it is shown that preliminary recreational fisheries have not reduced sustained levels of coho salmon in each ESU over initial (specified) years of fishing¹⁰.

Process:

- a. Identify feasible and appropriate areas for extension of fishery.
- b. Expand coho salmon recreational fishery.
- c. Conduct coho salmon population monitoring.
- d. Conduct inland spawning surveys.
- e. Conduct creel surveys.

⁸ Should be set in a 3-year increment and have an emergency trigger to close recreational fisheries based on events that could threaten coho salmon in a given year.

⁹ There is the potential to allow for an experimental fishery, which would not penalize those who caught coho salmon, prior to commencing a longer preliminary fishery. A creel survey strategy would be used to monitor what would occur.

¹⁰ Some areas, likely in the CCC ESU, may require decades, if ever, to allow for any recreational fishing.

Criterion 3 Resume permanent, recreational fisheries once expanded recreational fisheries have not reduced sustained levels of coho salmon in each ESU over the initial (specified) years of fishing¹¹.

Process:

- a. Resume permanent coho salmon fishery.
- b. Conduct coho salmon population monitoring.
- c. Conduct inland spawning surveys.
- d. Conduct creel surveys.

4.3.2 COMMERCIAL FISHING

There are two essential issues for the commercial fishing industry. The primary need is to have coho salmon recovery so that by-catch of coho salmon, when fishing for Chinook or other more abundant salmon species, is no longer a threat to coho salmon. A secondary objective of re-establishing a coho salmon commercial fishery is acknowledged and is not being dismissed at this time.

Criterion 1 Establish experimental ocean harvesting of other anadromous salmonids for (specified) years once the numbers of ocean coho salmon are sufficient to allow for removal of by-catch restrictions.¹²

Process:

- a. Evaluate area, timing, duration, and degree of experimental commercial salmon fishery.
- b. Open experimental commercial salmon fishery.
- c. Conduct coho salmon population monitoring.
- d. Conduct inland spawning surveys.
- e. Conduct creel surveys.
- f. Conduct commercial vessel catch monitoring.
- g. Conduct commercial landing monitoring.

Criterion 2 Commence experimental, limited commercial coho salmon fishery for (specified) years once it has been determined elimination of by-catch restriction for commercial harvest has not reduced sustained levels of coho salmon in each ESU over initial (specified) years of fishing.

¹¹ Extent of permanently established, recreational fishery will need to be based on any differential, regional effects to coho salmon by recreational catch.

¹² PFMC regulates ocean fishing. Part of that annual evaluation is by-catch restrictions on various fisheries due to the status of coho salmon. Once this restriction is deemed unnecessary by PFMC, commercial recovery criteria would be triggered.

Process:

- a. Evaluate area, timing, duration, and degree of experimental coho salmon commercial fishery.
- b. Open experimental commercial coho salmon fishery.
- c. Conduct coho salmon population monitoring.
- d. Conduct inland spawning surveys.
- e. Conduct creel surveys.
- f. Conduct commercial vessel catch monitoring.
- g. Conduct commercial landing monitoring.
- h. Conduct focused, financed, experimental commercial fishing.¹³

Criterion 3 Establish a limited commercial coho salmon fishery for (specified) years after it has been determined that the experimental commercial fishery has not reduced sustained levels of coho salmon in each ESU over the initial (specified) years.

Process:

- a. Evaluate feasible expansion of coho salmon commercial fishery.
- b. Expand coho salmon commercial fishery.
- c. Conduct coho salmon population monitoring.
- d. Conduct inland spawning surveys.
- e. Conduct creel surveys.
- f. Conduct commercial vessel catch monitoring.
- g. Conduct commercial landing monitoring.

¹³ Finance a limited number of commercial vessels to specifically investigate the ability to and impact of commercial fishing for coho salmon.

